Preserve and Prevent: Lean Body Mass in Oncology Patients

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Presentation Outline

1. Importance of malnutrition in the adult oncology patient and the effect on outcomes
2. Effect of lean body mass loss has on treatment outcomes in the adult oncology patient
3. Role of nutrition in improving outcomes for the adult oncology patient
4. Value of data collection in the US oncology setting

Thank you to ONDPG and

Oncology EAL Work Group

- Laura Elliot
- Vanessa Fuchs
- Maureen Huhman
- Rhone Levin
- Tami Piemonte
- Kyle Thompson
- The Academy staff

http://andevidencelibrary.com > disease/health conditions > oncology update

Malnutrition in the Adult Oncology Patient

- Weight loss and malnutrition are common in the oncology patient
- In a classic paper by Dewys 1980 malnutrition ranged 31% to 87%[1]
- 40% of hospitalized oncology patients were malnourished [2]
- Oncology nutrition risk studies show:
  - 32% outpatients mixed tumor types[3]
  - 34% malnourished, 42% at nutrition risk advanced colorectal cancer[4]
  - 88% pancreatic cancer[5]
  - 58% GI tumors[6]

1. Dewys *Am J Med* 1980; 2. Hebuterne *JPEN* 2014; 3. Lieffers *Br J Cancer* 2012; 4. Anton *Annals of Onc* 2010; 5. Prado *Lancet Onc* 2008; 6. Prado *Clin Ca Res* 2009

Weight Loss at Diagnosis

- Many patients present with nutritional issues prior to diagnosis[1-3]
  - More than 50% of patients reported some degree of weight loss 2-6 months prior to receiving treatment[4]
- Loss of >10% of pre-diagnosis weight is seen in approximately 45% of patients[2,3]
- Anti-cancer treatment can result in further weight loss and deterioration of nutritional status

1. DeWys WD et al. *Amer J Med* 1980; 69: 491-497. 2. Bozzetti F. Nutrition support in patients with cancer. In: Payne-James J; Grimble G, Silk D, eds. *Artificial Nutrition Support in Clinical Practice* 2001 pp. 639-680. 3. Bosaeus I et al. *J Cancer* 2001; 93: 380-383.
4. Halpern-Silveira D et al. *Support Care Cancer* 2010; 18: 617-625.

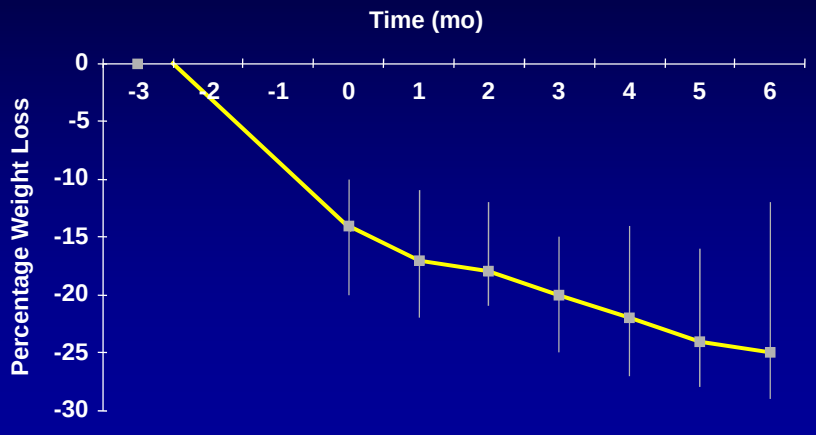
Weight Loss and Lean Body Mass

- Weight loss and poor nutrition status is associated with morbidity outcomes and mortality:
  - Hospital admissions and readmissions
  - Hospital length of stay
  - Quality of life
  - Tolerance to RT and CT treatment
  - Mortality
- LBM may be even more important to outcomes
- Definitions: LBM, Body Cell Mass, Fat Free Mass, Skeletal Muscle Mass

Fearon KCH, et al. *Lancet Oncology* 2011;12:489-495;
http://andevidencelibrary.com/files/Docs/ON%20Nutrition%20Status%20and%20Outcomes_%2007022013.pdf (accessed April 20, 2014)

Weight Loss in Patients With Advanced Pancreatic Cancer (n=20)

85% of patients cachectic at diagnosis



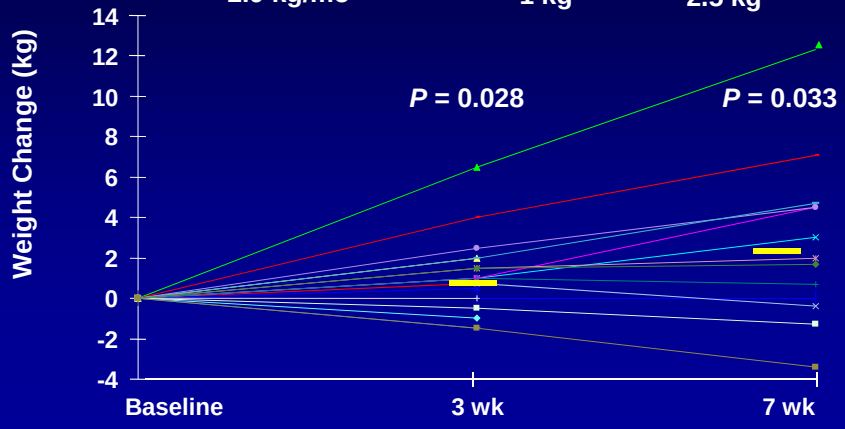
Wigmore et al: *Br J Cancer* 1997;75:106.

Weight Change

Prestudy median weight loss 2.9 kg/mo

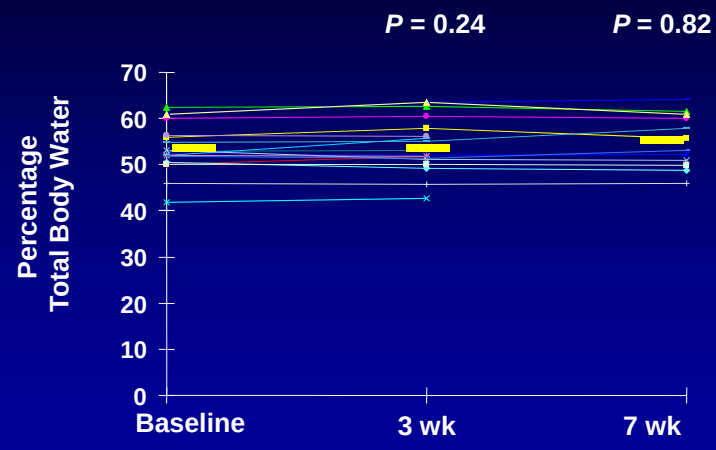
Median weight gain at 3 weeks 1 kg

Median weight gain at 7 weeks 2.5 kg



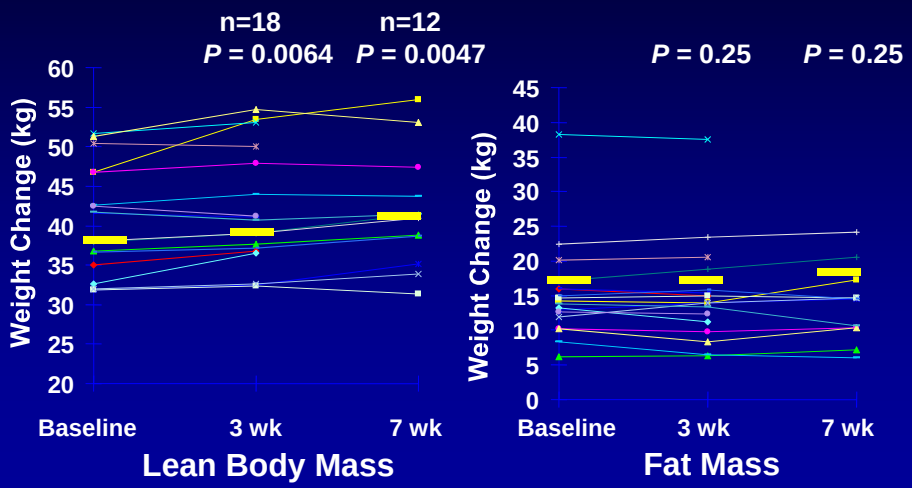
Barber et al: *Br J of Cancer* 1999;81:80-86.

% Total Body Water



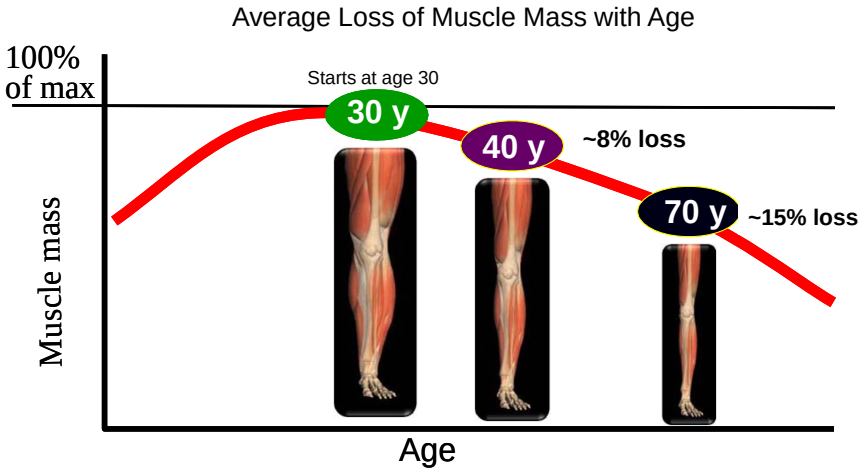
Barber et al: *Br J of Cancer* 1999;81:80-86.

Body Composition



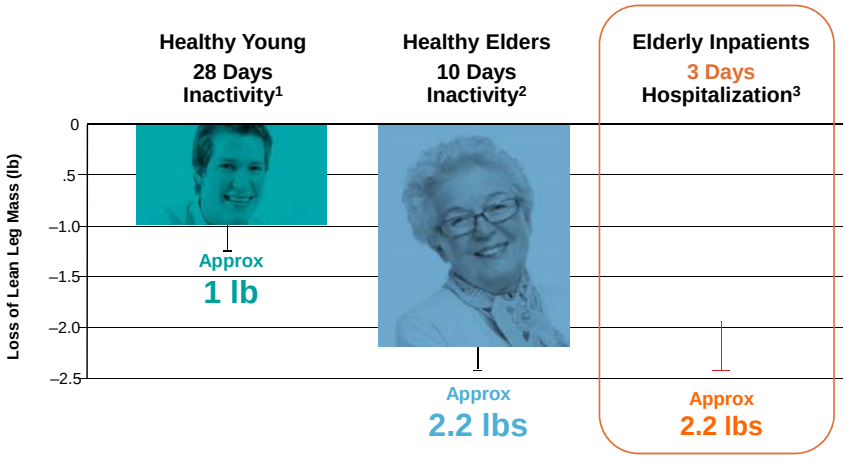
Barber et al: *Br J of Cancer* 1999;81:80-86.

Loss of muscle mass prior to diagnosis



Janseen I et al. *J Appl Physiol* 2000; 89: 81-88. Grimby G et al. *Acta Physiol Scand* 1982; 115: 125-134. Grimby G, Saltin B. *Clin Physiol* 1983; 3: 209-218. Larsson L et al. *J Appl Physiol* 1979: 46: 451-456.

Illness, particularly cancer, accelerates loss of LBM



Lean Body Mass Loss is Common

- Chemotherapy patients (n=174)[1]
  - 23% had malnutrition at admission
  - Significant fat-free mass loss (7.61%, p<0.001)
- Head and neck cancer patients (n=17)[2]
  - Weight loss began 1 week after concurrent chemoradiation
  - Average total loss of 6.8 kg (14.9 lbs) (P<.0001)
  - LBM accounted for 71.7±21% of body mass loss
  - LBM loss occurred despite stable energy and protein intake

1. Halpern-Silveira D et al. *Support Care Cancer* 2010; 18: 617-625
2. Silver HJ et al. *Head Neck* 2007; 29: 893-900.

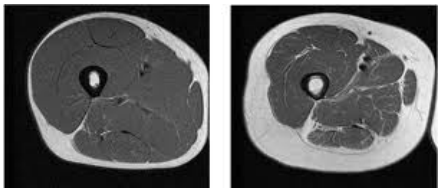
Lean Body Mass Loss is Associated with Poor Clinical and Functional Outcomes

- Reduced functional status in cancer[1]
  - Decreased total physical activity
  - Physical performance decline
  - Decreased strength
  - Increased functional dependence (ADLs)
- Reduced tolerance to cancer treatment[2,3]
  - Dose reduction and treatment delays and discontinuation
  - Decreased median survival time

1. Silver H et al. *Head and Neck* 2007;29:893-900.
2. Kadar L et al. *Ann NY* 2000; 904: 584-591.
3. Andreyev HJ et al. *Eur J Cancer* 1998; 34: 503-509.

Effects of Loss of LBM in Patients with Cancer

- Low muscle mass is common and independent predictor of immobility and mortality [1]
- Low muscle mass is an independent adverse prognostic indicator in obese patients [2]
- Patients with sarcopenia seem prone to toxic effects during chemotherapy[3,4,5] requiring dose reductions and treatment delays[5]



1. Prado, et al. Lancet Oncol. 2008;9:629-635.
2. Tan, et al. Clin Cancer Res 2009;15:6973-79.
3. Prado, et al. Curr Opino Support Palliat Care 2009;3:269-275.
4. Prado, et al. Clin Cancer Res 2007;13:3264-3268.
5. Prado, et al. Clin Cancer Res 2009;15:2920-2926.

Impact of Lean Body Mass

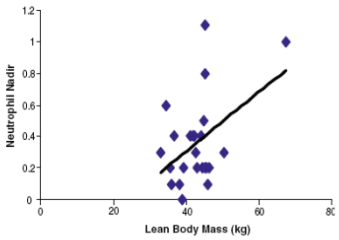
Cancer Chemotherapy and Pharmacology

An exploratory study of body composition as a determinant of epirubicin pharmacokinetics and toxicity

Carla M. M. Prado · Isac S. F. Lima · Vickie E. Baracos · Robert R. Bies · Linda J. McCargar · Tony Reiman · John R. Mackey · Michelle Kuzma · Vijaya L. Damaraju · Michael B. Sawyer

- LBM determinant of epirubicin toxicity in pts with breast cancer[1]
  - Same BSA but wide variation in LBM
  - Low LBM predicts toxicity p=0.002
  - LBM positively correlated with neutropenia nadir
    r=0.05, p=0.023

Capecitabine Tx of metastatic breast cancer[2]
  - Low LBM is determinant of CT toxicity and time to progression



1. Prado, et al. *Cancer Chemother Pharmacol* 2011;67:93-101
2. Prado, et al. *Clin Cancer Res* 2009;15:2920-26

Impact of Lean Body Mass

Low body mass index and sarcopenia associated with dose-limiting toxicity of sorafenib in patients with renal cell carcinoma

S. Antoun[1*†], V. E. Baracos[2†], L. Birdsell[2], B. Escudier[3] & M. B. Sawyer[2]

- Sorafenib's common toxic effects limit patient's ability to receive full-dose treament and account for:
  - dose reductions in 13% of patients
  - treatment termination in 21% of patients
- BMI < 25 kg/m^2 with decreased muscle mass is a significant predictor of toxicity in metastatic RCC patients treated with sorafenib.

Variable, average (SD)	Patients with dose-limiting toxicity	Patients who received the entire planned dose	Statistical values, *P*
Male	*n* = 8	*n* = 29	
Weight (kg)	75.1 (9.9)	84.8 (12.9)	NS
BMI (kg/m^2)	24.3 (2.7)	27.6 (3.5)	0.02
Skeletal muscle L3 index[a]	48.6 (4.4)	54.1 (6.0)	0.02
Adipose tissue L3 index[a]	92.3 (56.7)	118.4 (51.0)	NS

Antoun S, et al. *Annals of Oncology* 2010 doi:10/1093/annoc/md605

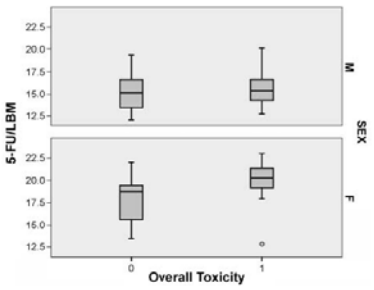
Impact of Lean Body Mass

Body Composition as an Independent Determinant of 5-Fluorouracil – Based Chemotherapy Toxicity

Carla M.M. Prado,[2] Vickie E. Baracos,[1,2] Linda J. McCargar,[2] Marina Mourtzakis,[1] Karen E. Mulder,[1] Tony Reiman,[1] Charles A. Butts,[1] Andrew G. Scarfe,[1] and Michael B. Sawyer[1]

- Mayo Clinic regimen 5-FU/leucovorin CRC
  - 35% had toxicity resulting in dose red, Tx DC, hosp, death
  - Dose based on BSA
  - 20mg 5-FU/kg LBM cut point for developing toxicities p=0.005
  - 56% had DR or Tx delays
  - Toxicities febrile neutropenia, fatigue, diarrhea, N&V

5FU/BSA or 5FU/kg B Wt not predictive

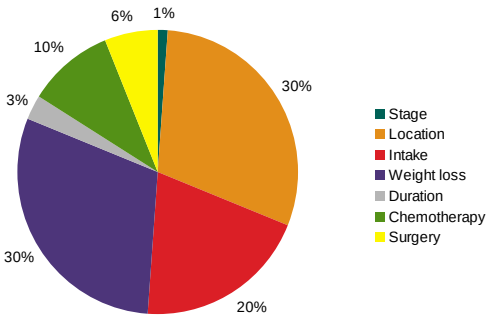


Prado, et al. *Clin Cancer Research* 2007;13:3264-68

Patient-centered outcomes

Nutrition Intervention Improves Outcomes in CIWL

- Nutritional status and intake are independent determinants of QoL as much as stage of disease, location of the cancer and treatment regimen in some types of cancer[1]
- Intensive nutrition therapy including ONS shown to improve[2]
  - Body weight and LBM
  - Hand grip strength
  - Physical activity[3]
  - Performance status
  - Dietary intake



1. Ravasco P, et al. *Supp Care Cancer* 2004;12:246-2521
2. Von Meyenfeldt M, et al. *Am Soc Clin Onc* 2002
3. Moses A, et al. *Br J Cancer* 2004;90:996-1002

Benefits of Nutrition Intervention

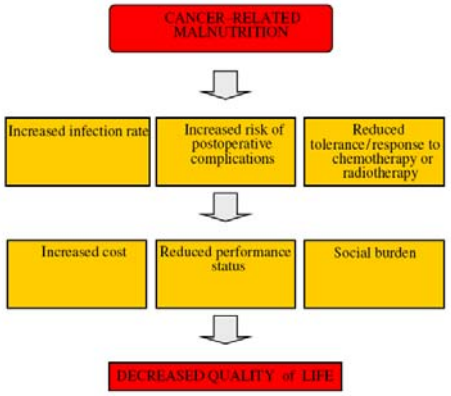


Figure 1 Cancer-related malnutrition has a major impact on clinical evolution and socioeconomics, and reduces quality of life.

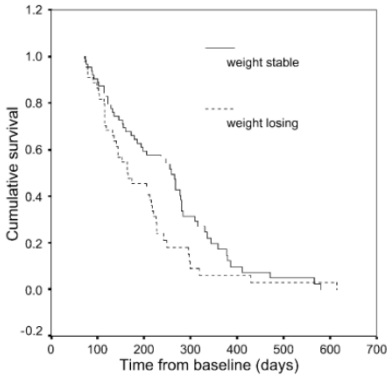
Marin Caro MM et al. *Clin Nutr* 2007; 26: 289-301.

Nutrition intervention started as early as possible can result in:

- Reduction or reversal of poor nutritional status
- Improvement of performance status
- Improvement in quality of life
- Increased treatment tolerance and response
- Decreased rate of complications

Nutrition Intervention in Weight Losing Patients Unresectable Pancreatic Cancer

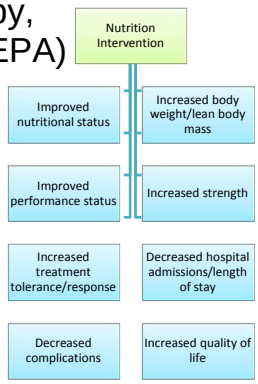
- Dietary counseling and Oral Nutritional Supplement over 8 weeks n=107
- Weight stabilization
  - Longer survival
  - Improved QoL (EORTC)
- Improved dietary intake



Davidson W, et al. *Clin Nutr* 2004;23:239-247

Nutrition Intervention in Weight Losing Adult Oncology Patients

- Strategies: medical nutrition therapy, oral nutrition supplements (HMB, EPA) enteral or parenteral support
- Goals
  - Prevent LBM loss
  - Avoid weight loss
- Results



Gagnon B. *Curr Oncol* 2013; Kiss NK *Supp Care Ca* 2012; Cereda *Clin Nutr* 2013; Rasco P. *J Clin Onc* 2005; Ravasco P. *Clin Nutr* 2007; Talwar B. *Curr Opin Supp Palliat Care* 2012.

Oncology nutrition: developing multimodal therapy for a multidimensional problem

- There is now substantive evidence that multimodal approaches that address the key issues surrounding cancer induced weight loss can stabilize and even improve the nutritional status, function and quality of life of at least a proportion of advanced cancer patients.
- Include nutrition intervention, exercise, and anti-inflammatory medications – large trials ongoing
- Large pharma trials ongoing to improve muscle mass and function

Fearon KCH. *EJC* 2008;44:1124-32; Chasen MR Supp Care Ca 2010;18:35-40

US Based Oncology Nutrition Research

- Karen Randall will describe some work she has recently completed
- Important to have US data in US health care system
- Studies to be included in meta-analyses and systematice reviews
- Comparable endpoints in similar populations
  - Select and describe patient populations
  - Surgical patients different than patients undergoing RT or CT
  - Mixed tumor type studies add complexity
  - Measure similar outcomes

What did she say?

1. Cancer induced weight loss results in:
   - Decreased quality of life
   - Increased complications
   - Poorer response to therapy
2. Type of weight loss is important
   - LBM loss contributes to greater treatment associated toxicities
   - Dose reductions and treatment delays
   - Patients with sarcopenic obesity have poorer outcomes
3. Benefits of nutrition intervention
   - Improved functional outcomes
   - Better response to therapy
4. US based research needed
   - Patient selection similar to other studies
   - Outcomes measured similar to other studies

THANK YOU!

QUESTIONS?

St. Vincent Health

Screening for Malnutrition Risk in the Cancer Patient

Presenter: Karen Randall RD CSO CD

THE SPIRIT OF CARING®

Disclosure

The content of this program has met the continuing education criteria of being evidence-based, fair and balanced, and non-promotional.

This educational event is supported by Abbott Nutrition Health Institute, Abbott Laboratories.

The presenter was compensated by Abbott Nutrition.

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Picture of St. Vincent Cancer Care Center

- Bed Size: 770
- New Analytic Cases 2013: 2527
- Medical Staff:
  - 10 Med Oncs (Private Practice)
  - 5 Rad Oncs
  - 4 H/N Surgeons
  - 3 Nurse Practitioners
- 1 Part-time RD .6 FTE (based in Radiation Department, Outpatient Nutrition Services billed)
- 2 Radiation Machines, average 70 patients treated daily
- Paper Chart until 10/2013

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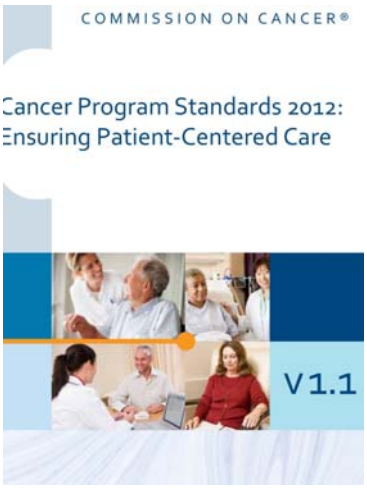
American College of Surgeons

The newest Cancer Program Standards 2012: Ensuring patient-Centered Care has increased the importance of nutrition services by establishing Eligibility Requirement E12 which highlights the **inclusion of screening** for nutrition related problems.



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In February of 2013 a modified version of the MST was initiated by radiation oncology nutrition services and data was collected for 6 months.

Oncology Nutrition Screen

1. Have you/the patient lost weight recently without trying? (applies to the last 6 months)
   - No 0
   - Unsure* 2
   - Yes, how much?
     - 2-13 lb 1
     - 14-23 lb 2
     - 24-33 lb 3
     - 33 lb or more 4
     - Unsure* 2

   *if unsure, ask if they suspect they have lost weight – eg, clothes are looser

   Weight loss Score ☐

2. Have you been eating poorly because of a decreased appetite? (eg, eating less than 75% of usual intake or eating poorly due to swallowing problems)
   - No 0
   - Yes 1

   Appetite Score ☐

3. Do you have?
   - Lung Cancer 2
   - Rectal Cancer 2
   - Head/neck Cancer 3
   - Pancreatic Cancer 3
   - Gastric Cancer 3
   - Esophageal Cancer 3
   - Liver Cancer 3
   - Colon Cancer 3
   - Another Cancer with metastatic disease 2

   Diagnosis Score ☐

TOTAL SCORE ☐

RN Signature and Date _____

SCORE and MALNUTRITION RISK	
0-1	NO RISK
2	MILD RISK
3-4	MODERATE RISK
5 or >	HIGH RISK

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Work Flow of Screen

Nurse completes screen at patient's initial visit

↓

Completed screen placed in RD mailbox

↓

RD collects screens and evaluates scores

↓

RD completes MD order request for Nutrition consult

↓

MD signs order

↓

Radiation Therapist schedules patient to see Dietitian when making treatment schedule

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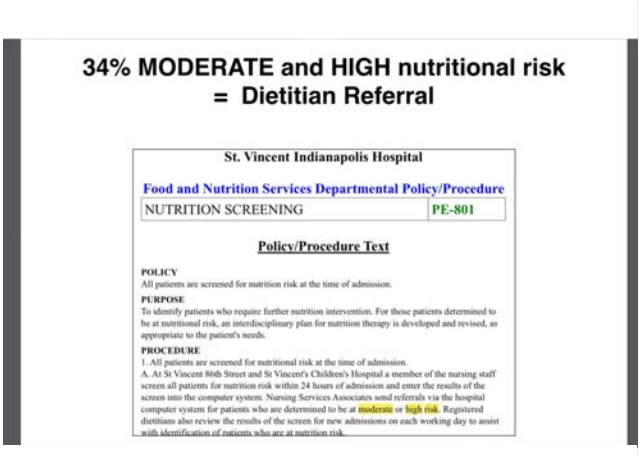
34% MODERATE and HIGH nutritional risk = Dietitian Referral



St. Vincent Indianapolis Hospital

Food and Nutrition Services Departmental Policy/Procedure

NUTRITION SCREENING	PE-801

Policy/Procedure Text

POLICY
All patients are screened for nutrition risk at the time of admission.

PURPOSE
To identify patients who require further nutrition intervention. For those patients determined to be at nutritional risk, an interdisciplinary plan for nutrition therapy is developed and revised, as appropriate to the patient's needs.

PROCEDURE
1. All patients are screened for nutritional risk at the time of admission.
A. At St Vincent 86th Street and St Vincent's Children's Hospital a member of the nursing staff screen all patients for nutrition risk within 24 hours of admission and enter the results of the screen into the computer system. Nursing Services Associates send referrals via the hospital computer system for patients who are determined to be at moderate or high risk. Registered dietitians also review the results of the screen for new admissions on each working day to assist with identification of patients who are at nutrition risk.

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53% of new patients that walk through "OUR" doors are at risk for malnutrition before they start radiation therapy

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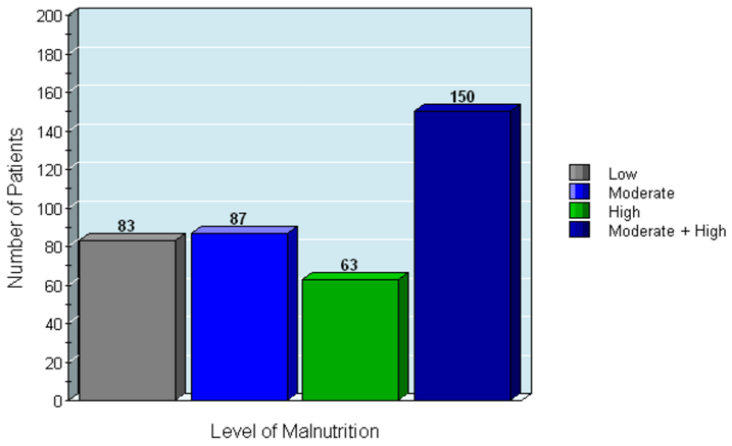
Malnutrition Risk Levels of Patients



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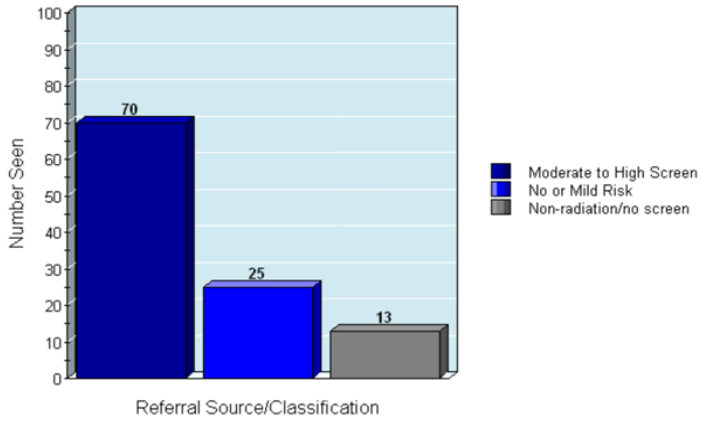
New Patients Consulted (108)



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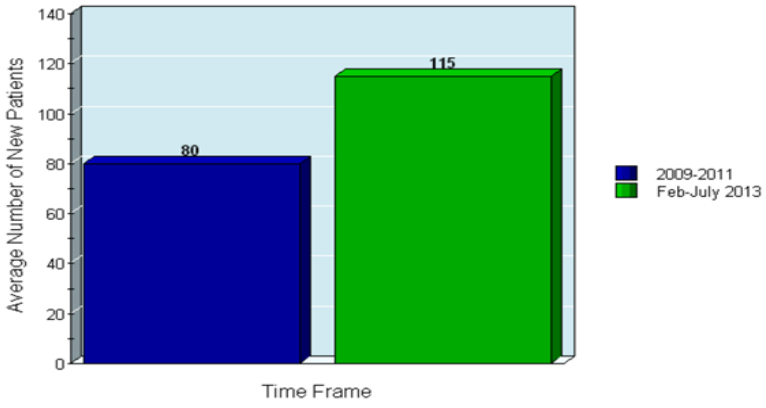
Consult Change with Screen Implementation



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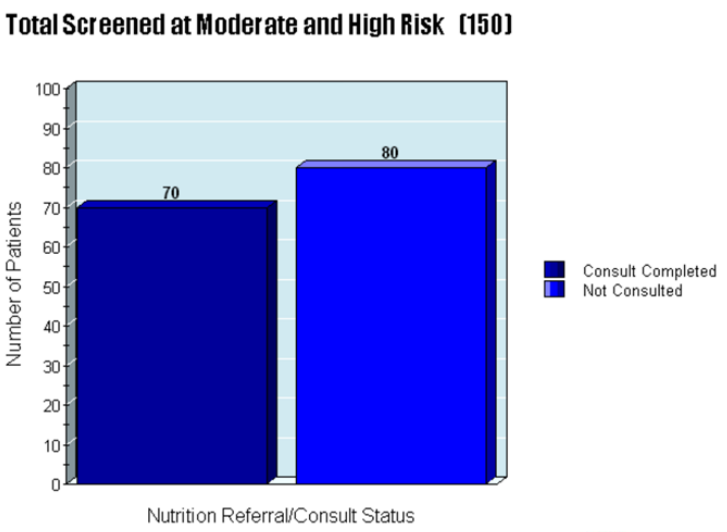

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Results of Quality Improvement Project

- Compliant with 2012 American College of Surgeons Cancer Standards with screening.
- 53% (233/443) patients at risk for malnutrition before starting any treatments.
- 80 of 150 (53%) identified as **MODERATE** to **HIGH** nutrition risk **DID NOT** receive nutrition services.
- Increased consults by ~50% (80 to 115)

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Summary of Odelli's Study Results: Early Nutrition Assessment and Intervention Improves Outcomes and Treatment Tolerance in Patients with Cancer

	Control Group	Nutrition Pathway Group
Weight change during tx	8.9%	4.2%
Chemo dose reduced	42%	29%
Patients completing radiation	50%	92%
Receive 100% of radiation dose	95%	100%
Unplanned hospital stay	75%	46%
LOS for unplanned stay	13.5 days	3.2 days

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Using our numbers in Odelli's study(3)

	"80" pts identified by screen to need RD consult, but NOT SEEN	"70" pts Seen by RD
Weight Loss	**~9.0%**	**~4.2%**
Chemo Dose Reduction	**42%** 34 of 80	**29%** 20 of 70
Patients completing radiation	**50%** 40 of 80	**92%** 64 of 70
Receive 100% of radiation dose	**95%** 76 of 80	**100%** 70 of 70
Unplanned hospital stay	**75%** 60 of 80	**46%** 32 of 70
LOS	13.5 days X 60 = **810 days**	3.2 days X 32 = **102 days**
~$4,800/hospital bed	**$3,888,000.00**	**$491,520.00**
Ave 45 minute consult fee with RD	**~$ 7,000.00 not billed**	**~$ 6,000.00 billed**

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Reaching our Goal

- Screening tool now paperless.
- Central Scheduling to schedule non-radiation consults.
- Based on Gill's survey of NCI Cancer Centers(4) yearly cases of ~1,100 patients a year = 1.5 RD FTE
- Develop plan for rolling out “screen” to other spokes of St. Vincent Cancer Care (HOI, AHN, GYN/Onc = 1,600 annual patients).

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References

1. Halpern-Silvera D, et al. *Support care cancer.* 2010; 18:617-625.
2. Dewys WD, et al. *Am J Med.* 1980;69:4 91-497.
3. Odelli C. et al. *Clin Oncol.* 2005;17: 639-645.
4. Gill C. et al. *Defining Optimal Nutrition Support in NCI Centers.* 2012.

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To print your certificate, go to www.anhi.org/certificate
(You have until June 2, 2014 to print your certificate)

- Enter Event ID **16986**

- Log in with your ID and password or register if you do not already have an ID and password on www.anhi.org
- Follow the instructions to complete course evaluation
- Print certificate
- **NOTE:** Your browser must be set to allow pop-ups on this site
- **If assistance is needed, click on the Contact Us tab in the left-hand menu**

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